## Module Description 2016/17
School of Computer Science and Statistics.

<table>
<thead>
<tr>
<th>Module Code</th>
<th>CS3031</th>
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<tbody>
<tr>
<td>Module Name</td>
<td>Advanced Telecommunications</td>
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<tr>
<td>Module Short Title</td>
<td>N/a</td>
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<tr>
<td>ECTS weighting</td>
<td>5</td>
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<tr>
<td>Semester/term taught</td>
<td>Second Semester</td>
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</table>
| Contact Hours | Lecture hours: 33  
Lab hours: 4  
Total hours: 37 |
| Module Personnel | Hitesh Tewari |
| Learning Outcomes | When students have successfully completed this module they should be able to:  
- Demonstrate an in-depth knowledge of the Transport and Application Layers;  
- Have a good understanding of cryptography, network security, electronic payments, mobile communications and multimedia networking issues on the Internet  
- Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies;  
- Specify and identify deficiencies in existing protocols, and then go on to formulate new and better protocols;  
- Provide an in-depth commentary on future networking and data communications technologies, with a view to incorporating these into the existing organizational network environment.  
- Have a working knowledge of network programming using sockets and the use of a cryptographic library, both of which the students must use as part of their continuous assessment tasks. |
| Module Learning Aims | This option concentrates on building upon the students JF and SF years knowledge and introduces them to advanced topics in the areas of data communications and telecoms networks. A detail study is made of the TCP protocols in terms of multiplexing, flow and congestion control to understand the effects congestion in a large distributed network such as the Internet. A number of Application Layer protocols such as HTTP, SMTP, DNS and AJAX are studied to understand how Web Applications are designed today. The students are given a in-depth Network Security module which gives them an appreciation of how to secure communications over an open network such as the Internet. They are also introduced to the topics of Electronic Payments and Mobile Communications. |
Specific topics addressed in this module include:

- **Transport Layer Issues** – Multiplexing, UDP, TCP, Flow Control, Congestion Control
- **Application Layer Issues** – HTTP, SMTP, DNS, Web Applications
- **Electronic Payment Systems** – Ecash, Bitcoin, Micropayments
- **Mobile Communications** – Multiplexing, Medium Access Control Issues, 2G, 3G & 4G Systems, 802.11 WiFi

**Recommended Reading List**

- Data Communications and Networking, 4th Ed., Behrouz Forouzan, McGraw Hill

**Module Pre Requisite**

CS2031 – Telecommunications II

**Module Co Requisite**

**Assessment Details**

Assessment is by examination (80%) and continuous assessment (20%). Continuous assessment is composed of two substantial programming assignments which the students are required to demo at a lab session.

The supplemental assessment will be based solely (i.e. 100%) on the written exam.